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(54) Title: RADIOACTIVE TRANSITION METAL-IMIDO HETERO-DIPHOSPHINE COMPLEXES, THEIR PREPARATION AND RADIOPHARMACEUTICAL COMPOSITIONS THEREOF

(57) **Abstract:** The present invention provides radioactive metal heterocomplexes of formula (I):  $[(Me=N-R)L_1L_2]+Z$  (I), wherein Me, R,  $L^1$ ,  $L^2$  and Z have the meanings indicated in the description. The complexes include a trivalent radioactive metal-imido group, typically a technetium- or rhenium-imido group, strongly stabilized by the presence of an ancillary tridentate hetero-diphosphine ligand  $L^1$ , which allows the formation of substitution-inert  $[(Me=N-R)L^1]$  moieties. Such moieties are fixed in an intermediate  $[(Me=N-R)Y_2L^1]^+$  compound which contains two labile, cispositioned, Y ligands, where Y is preferably an halide group. The latter are easily replaced by a bidentate ligand  $L^2$  to give the final  $[(Me=N-R)L^1L^2]^+Z$  heterocomplexes. The complexes of the invention are useful for the preparation of radiopharmaceuticals: in fact, a bioactive fragment which confers biological target-seeking properties can be introduced either on the  $L^2$  framework or the imido R group.